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Session 8: Opening Remarks

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Session VIIIA Opening Remarks by the Chairman
Ricardo Dobry
"Soil Amplification During Earthquakes and Microzonation"

Clearly our subject this afternoon is very important, and, if you define microzonation as including both soil amplification and ground failure effects, it covers a lot of material. However, as liquefaction and the effects of the Loma Prieta earthquake will be discussed separately in other sessions, we will concentrate here on ground motion amplification effects.

Let me first make a couple of brief comments on why and how earthquake soil effects have become a subject of concentrated attention and research in the last 5-6 years. First, we have known for a long time -- and a number of recent earthquakes have forcefully reminded us -- that soil effects can have a big effect on ground motions and damage during earthquakes. These recent earthquakes include: Mexico City 1985, Armenia 1988, Loma Prieta, CA 1989, Phillippines 1990, and Iran 1990.

A second indication is the number of meetings on the subject we are having during this same period. In addition to this International Conference, we have had several meetings in Mexico City to discuss the 1985 earthquake and subsequent research; the 1988 ASCE Park City Specialty Conference on Recent Advances in Ground Motion Evaluation; the 1989 Palo Alto, CA NSF-EPRI Workshop on Dynamic Soil Property and Site Characterization; several US-Japan meetings from 1988 to 1990 on Liquefaction and Large Ground Deformation; and the upcoming 4th International Conference on Seismic Zonation to be held in San Francisco in 1991.

But, fortunately, we are not only talking, we are also doing something about clarifying the key issues. There is a lot of activity going on in several countries in the planning and installing of a variety of surface and buried arrays. some of them have already produced valuable information. Different types of instruments are being installed and more of our research is starting to focus on in situ testing, lab testing, and analytical interpretation or developments related to these arrays or records obtained from them.

Let me give you two personal thoughts on the subject.

Thought No. 1

Geotechnical engineers, geologists, and seismologists are condemned to work together in the areas of soil amplification and microzonation. We simply do not have any option, and this is becoming increasingly clear to everyone.

Thought No. 2

To paraphrase Einstein as cited yesterday by Prof. Zienkiewicz, let me offer the following modified Einstein-Zienkiewicz-Dobry statement: "Models of Soil Amplification and Microzonation Must be Simple, But not too Simple." The table attached shows the different ways in which geotechnical engineers and earth scientists have simplified (oversimplified?) or complicated (perhaps too much?) the soil amplification phenomenon. It is only through research of the evidence -- especially that coming from arrays -- and by discussing and listening to each other, that we will be able to find out the right level of complexity appropriate in different circumstances.

And now, it is my pleasure to introduce to you the General Reporter of this session, Dr. Carl Stepp from the Electric Power Research Institute (EPRI). Dr. Stepp received his B.S. in Geology from Oklahoma State University, his M.S. in Geophysics from the University of Utah, and his Ph.D. in Seismology from Pennsylvania State University. His work experience has included the following positions: Research Seismologist with the U.S. Coast and Geodetic Survey, 1961-1973; Manager of Geosciences with the U.S. Nuclear Regulatory Commission, 1973-1979; and currently, Manager of the Seismic Center at EPRI. His main interests are in seismological research aspects related to earthquake engineering. He is also currently President of the Earthquake Engineering Research Institute (EERI).

	Geotechnical Engineers	Geologists and Seismologists
As Simple As Possible ...	· 1-D Modeling (Site) · Only a Few Hundred Feet of Soil Important (Soil/Soft Rock V_s = 2500 ft/sec is defined as Rock) · Source/Path Effects Neglected	· Only Linear Soil Need To Be Considered
... But Not Too Simple?	· Soil Nonlinearity Must Be Considered	· 2D/3D Modeling (Valley) · Soil/Soft Rock Needs to be Considered Down to Basement Rock · Source/Path Effects Considered